

WHAT IS CLAIMED IS:

1. A digital down-converter for converting a frequency of a signal, received at a radio receiver and sampled with a radio frequency (RF) or an intermediate frequency (IF), to a detection frequency for a detection process, comprising:

a first mixer for converting a frequency of the received signal to a frequency of a first IF signal; and

a second mixer for converting the first IF signal converted by the first mixer to a second IF signal of the detection frequency, and outputting the second IF signal as a complexed signal.

2. The digital down-converter as claimed in claim 1, wherein a frequency of the first IF signal is $1/4$ a sampling frequency.

3. The digital down-converter as claimed in claim 2, further comprising an automatic gain control (AGC) amplifier for amplifying an output of the first mixer.

4. The digital down-converter as claimed in claim 2, wherein the second mixer is constructed in a polyphase structure comprised of a decimation filter and a quadrature converter.

5. A receiver comprising:

a digital down-converter including a first mixer for converting a frequency of a received signal, sampled with a radio frequency (RF) or an intermediate frequency (IF), to a frequency of a first IF signal, and a second mixer for converting the first IF signal converted by the first mixer to a second IF signal of a detection frequency for a detection process and then outputting the second IF signal as a complexed signal;

a radio receiver for receiving an input signal and providing the received signal to the digital down-converter for frequency conversion;

a filter for attenuating an aliasing frequency component and an image frequency component of the first mixer in the digital down-converter, from an
5 output of the radio receiver; and

an analog-to-digital converter for sampling an output of the filter with a radio frequency or an intermediate frequency and providing the sampled signal to the digital down-converter.

10 6. The receiver as claimed in claim 5, wherein a frequency of the first IF signal is $1/4$ a sampling frequency.

7. The receiver as claimed in claim 6, further comprising an automatic gain control (AGC) amplifier for amplifying an output of the first
15 mixer of the digital down-converter.

8. The receiver as claimed in claim 6, wherein the second mixer of the digital down-converter is constructed in a polyphase structure comprised of a decimation filter and a quadrature converter.

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